

REMARKS

I. Formalities

Applicants thank the Examiner for acknowledging Applicants' claim for foreign priority and receipt of the certified copies of the priority documents. However, the Examiner maintains that Applicants cannot claim priority from DE 103 43 333.3, filed in Germany on September 12, 2003, because the U.S. application was allegedly filed more than twelve months thereafter. Applicants respectfully disagree. The present application is the U.S. National Stage entry of PCT/EP2004/010188, which was filed on September 13, 2004. Because September 12, 2004 fell on a Sunday, the filing of the PCT application on Monday, September 13, 2004 was sufficient to obtain priority from DE 103 43 333.3.

Applicants also thank the Examiner for considering most of the references listed on the PTO/SB/08 Forms submitted with the Information Disclosure Statements of March 13, 2006, February 12, 2007, August 9, 2007, and August 4, 2008. However, the Examiner has not considered JP 11-3849 because the IDS of March 13, 2006 allegedly does not include a concise explanation of the relevance of this foreign-language document. Applicants respectfully disagree. Applicants submitted an International Search Report from the European Patent Office that cited JP 11-3849 and indicated the relevant sections of JP 11-3849 in the English language. Applicants are attaching hereto a new PTO/SB/08 Form listing only JP 11-3849. Applicants respectfully request that the Examiner indicate consideration of JP 11-3849 by initialing, signing, and returning the attached PTO/SB/08 Form with the next Office Action.

In addition, Applicants thank the Examiner for listing WO 00/36470 on the PTO-892 Form. Applicants are amending paragraph [0007] of the specification to correct the listing of this reference in the specification.

Further, Applicants thank the Examiner for accepting the replacement drawings filed on February 12, 2007.

II. Status of the Application

By the present Amendment, Applicants are amending claims 47, 63, and 80. Further, Applicant is adding new claim 92 to recite features of the invention as disclosed in the specification. No new matter is added.

Accordingly, claims 47, 49-66, and 68-92 are all the claims currently pending in the application. Claims 47, 53-59, 61, 63-66, and 80 have been rejected. Claims 49-52, 62, 68-79, and 81-91 have been withdrawn. The present Amendment addresses each point of objection and rejection raised by the Examiner. Favorable reconsideration is respectfully requested.

III. Specification

The Examiner suggests that Applicants use the guidelines provided in 37 C.F.R. § 1.77(b) for the preferred layout of the specification. Applicants are amending the specification to add appropriate section headings.

IV. Objections to the Claims

The Examiner has objected to claims 47, 63, and 80 for various informalities. Applicants are amending claims 47 and 80 as suggested by the Examiner. Further, Applicants are amending claim 63 to clarify that “at least some of the individual mirrors of the mirror arrangement have an optical structure which forms a distribution of the radiation reflected from the respective

individual mirror” (emphasis added). Support for this amendment can be found at least in paragraph [0027] of the original specification. Applicants respectfully request that the Examiner withdraw the objections to the claims.

V. Claim Rejections Under 35 U.S.C. § 103(a)

Claims 47, 53-57, 61, 63, 65, and 80 stand rejected under 35 U.S.C. § 103(a) as allegedly being anticipated by U.S. Publication No. 2002/0136351 to Singer in view of U.S. Patent No. 6,285,443 to Wangler et al. (hereinafter “Wangler”). Claims 58 and 59 stand rejected under 35 U.S.C. § 103(a) as allegedly being anticipated by Singer and Wangler in view of U.S. Patent No. 6,438,199 to Schultz et al. (hereinafter “Schultz”). Claim 64 stands rejected under 35 U.S.C. § 103(a) as allegedly being anticipated by Singer and Wangler in view of U.S. Publication No. 2002/0105629 to Sandstrom et al. (hereinafter “Sandstrom”). Claim 66 stands rejected under 35 U.S.C. § 103(a) as allegedly being anticipated by Singer and Wangler in view of U.S. Patent No. 5,453,814 to Aiyer et al. (hereinafter “Aiyer”). Applicants traverse these grounds of rejection.¹

In rejecting independent claim 47, the Examiner maintains that Singer discloses each feature recited claim 47, except for the axicon system that is arranged between the optical modulation device and the pupil-shaping surface. However, the Examiner maintains that Wangler discloses an axicon system, and that it would have been obvious for a person of ordinary skill in the art to include the axicon system of Wangler in the system of Singer, because “an axicon in an illumination system is commonly used to adapt annular illumination, thereby

¹ Applicants note that the Examiner has not addressed claim 60 in the present Office Action. Therefore, Applicants assume that claim 60 is patentable over the cited references.

achieving a desired illumination distribution” (Office Action, page 7, lines 8-12). Applicants respectfully disagree.

Claim 47 recites an illumination system in which “between the light source and the optical modulation device, there is arranged an optical device which concentrates radiation incident on the optical device onto the individual elements of the optical modulation device.” In rejecting claim 47, the Examiner maintains that the collector mirror (3) of Singer corresponds to the recited optical device. Applicants respectfully disagree.

As shown in Fig. 5a of Singer, the collector mirror (3) collects light from the light source (1) and reflects the light onto the first raster element plate (7) ([0054], [0070], [0074]). Fig. 5a of Singer shows that the collector mirror (3) *floods the entire area* of the first raster element plate (7) with light, including spaces between the individual raster elements (5). In contrast, claim 47 recites that the optical device *concentrates* radiation *onto the individual elements* of the optical modulation device. Applicants submit that the collector mirror (3) of Singer does not concentrate radiation onto the individual raster elements (5), as recited in claim 47.

However, in order to further clarify the claimed invention, Applicants are amending claim 47 to recite that “the optical device forms a plurality of beams from the incident radiation and concentrates each of the plurality of beams onto a respective individual element of the optical modulation device.” Support for this amendment can be found at least in Figs. 1 and 2 and paragraphs [0028], [0029], and [0039]-[0042] of the original specification. In contrast, as discussed above, the collector mirror (3) of Singer directs a single beam onto the entire area of the first raster element plate (7), and does not form a plurality of beams or concentrate each of a plurality of beams onto a respective individual raster element (5).

Applicants submit that claim 47 is patentable over Singer at least by virtue of the aforementioned differences, as well as its additionally recited features. Further, Wangler fails to remedy the deficient teachings of Singer. Therefore, claim 47 is patentable over the alleged combination of Singer and Wangler for at least the reasons discussed above.

Further, Applicants submit that a person of ordinary skill in the art would not have modified the illumination system of Singer to include the axicon system of Wangler. As the Examiner recognizes, the embodiment shown in Fig. 5a of Singer shows an illumination system for extreme ultraviolet radiation (EUV). As a person of ordinary skill in the art understands, EUV radiation cannot be influenced by refractive optical elements (such as lenses), and can only be influenced by reflective optical elements. Therefore, the illumination system shown in Fig. 5a of Singer only includes mirrors, which guide light emitted by the light source (1) onto a reflective mask. In contrast, Wangler shows an illumination system for the deep ultraviolet (DUV) range consisting entirely of transparent optical elements. Notably, the axicon pair (21) of Wangler consists of two conical lenses that transmit the light. Applicants submit that a person of ordinary skill in the art would have understood that the lenses of the axicon pair (21) of Wangler would not function properly in the EUV illumination system of Singer.

In addition, Applicants submit that there is no motivation to include an axicon system in the illumination system of Singer. As the Examiner states, an axicon is commonly used in an illumination system to adapt illumination, as pointed out by Wangler in column 4, lines 38-42. However, the illumination system of Singer does not need such additional elements, because the system is already capable of providing such illumination settings. Figs. 6b.2 and 8 of Singer demonstrate that the illumination system of Singer is already capable of providing angular

illumination settings for which an axicon system may be needed in other systems, like those of Wangler. Therefore, a person of ordinary skill in the art would not have modified the illumination system of Singer with an axicon system as shown in Wangler.

Applicants submit that claim 47 is patentable over Singer and Wangler for at least the reasons discussed above. Further, Schultz, Sandstrom, and Aiyer fail to remedy the deficient teachings of Singer and Wangler. Therefore, claims 53-59, 61, 63-66, and 80 are patentable over Singler, Wangler, Schultz, Sandstrom, and Aiyer at least by virtue of their dependencies on claim 47, as well as their additionally recited features.

VI. New Claim

Applicants are adding new claim 92 to recite that “the optical device comprises a two-dimensional raster arrangement of optical elements or a diffractive optical array generator.” Support for claim 92 can be found at least in paragraph [0028] of the original specification. Applicants respectfully submit that the cited references, alone or in combination, fail to teach or suggest the quoted claim feature.

VII. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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